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ABSTRACT

This report summarizes the background and purpose of the Friedrichsdorf, West Germany UNISIST meeting and describes the principal issues which emerged from the papers presented and the accompanying discussion. Topics of discussion reported include: (1) the availability of information resources at the national level, particularly concerns of document delivery and information transfer; (2) expansion of the scope of the scientific and technological information universe to include unpublished report literature, numeric databases, and other nonconventional sources of information, as well as the extension of the UNISIST concept into more fields of knowledge than science and technology; (3) accommodation to rapid technological change in computers, computer networks, online searching, and other technologies; and (4) the interdependence of and the need for cooperation between national information systems. Background details on the 1976 UNISIST meeting and interim developments are also provided. Annexes comprise comments by the meeting rapporteur on the significance and accomplishments of the UNISIST program and a list of meeting participants, consultants, representatives, observers, and conference staff and UNESCO personnel in attendance. (ESR)

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Management of Information Resources at the National Level

Main issues discussed at the Second UNISIST Meeting on the Planning and Implementing of National Information Activities in Science and Technology

Friedrichsdorf, Federal Republic of Germany
26-30 September, 1977

Prepared under contract for Unesco by Scott Adams

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1. Background

The second UNISIST Meeting on the Planning and Implementing of National Information Activities in Science and Technology was convened and organized by Unesco, within the framework of the General Information Programme and hosted by the Federal Republic of Germany, represented by the Institut für Dokumentationswesen, in Friedrichsdorf from 26-30 September 1977.

This report summarizes the background and purpose of the meeting, and describes the principle issues which emerged from the papers presented, and from the accompanying discussions.

The meeting was conceived as a function of UNISIST, Unesco's programme for fostering international co-operation in the field of scientific and technical information. From its earliest days, the UNISIST programme had urged that governments wishing to participate in this co-operation establish governmental (or government-chartered) agencies as national focal points to:

1. plan, co-ordinate and promote the development of infrastructures (manpower, information resources, delivery systems and libraries) in support of their national scientific and technical information programmes;

2. develop the information service components of national plans for economic and social development;

3. co-ordinate sectoral information resources and services at the national level;

4. serve as foci for the increased levels of co-operative activities foreseen by the UNISIST programme at the international level.

In response to an invitation from Unesco's Director-General, Member States had established 49 national focal points and 46 national committees for UNISIST by mid-1977. Unesco promptly undertook a series of efforts to assist in the establishment of the national focal points and to advance their co-operation. These included the preparation of two sets of guidelines for the establishment of the focal points and national committees for UNISIST, and the holding of three regional meetings for governmental experts in Colombo (1974), New Delhi (1976) and Tunis (1976).

It became apparent that one of the most fruitful ways of assisting the Member States in their efforts to establish national scientific and technological information programmes was to create opportunities for their planners and developers to exchange experience amid relaxed and informal surroundings. This led to the holding of the first UNISIST Meeting on the Planning and Implementing of National Information Activities in Science and Technology in Herceg Novi, Yugoslavia, from 20 to 23 April 1976.

The Herceg Novi Meeting

This first forum, which was jointly sponsored by the Yugoslav National Committee for Unesco, the (Canadian) International Development Research Centre, and Unesco, had as its theme: Information Policy for Development: National and International Responsibilities. Its discussions were focused on national information policy in its relation to national development policy, on the setting of priorities in the context of national needs and on options for the establishment of national focal points, their role in the development of national information plans, and their interaction through regional and international activities.

No minutes were kept of the Herceg Novi proceedings, nor resolutions adopted. Instead, an informal report, without making attribution to individuals or countries, recorded the basic areas of agreement and the different viewpoints expressed.(1)

The Herceg Novi participants agreed that the opportunity of exchanging views and experience with colleagues who represented a variety of approaches to the establishment of national scientific and technological information systems was of great value. Accordingly, Unesco, with the help of a small group of experts, undertook to plan a second opportunity for the exchange of experience at the international level. In contra-distinction to Herceg Novi, however, this second meeting was to focus on commonly experienced problems in the management of national scientific and technological information programmes.

Interim developments

In the short time between the two meetings, a number of developments occurred affecting the course of scientific and technological information programmes at both the national and the international level. Since a number of the Friedrichsdorf participants had been involved in or were aware of these developments, it seems appropriate to note them briefly as a part of the historical background. Among these were:

The reorganization of Unesco's information programmes, voted by the nineteenth session of the General Conference in Nairobi in October, 1976 (resolution 5.1) and subsequently implemented by action of the Director-General on 24 February 1977. In this reorganization, the Division of Scientific and Technological Information and Documentation and the Division of Documentation, Libraries and Archives were merged into a new Division of the General Information Programme. The nineteenth session of the General Conference expressly instructed the Intergovernmental Council, set up to provide guidance for the General Information Programme, to ensure continuity in the development of activities undertaken in the context of the UNISIST programme.

The study conducted by the United Nations Inter-Agency Task Force on Information Systems (IATFIS) pursuant to resolution 3507 (XXX) of the United Nations General Assembly on the establishment of an international network for the exchange of technological information supportive of the transfer of technology. This study, in which Unesco and the UNISIST concept played a significant role, has produced an inventory of the specialized information systems and services under development by agencies of the United Nations family, and has recommended to the General Assembly the concept of an international programme of co-operative action designed to support the activities of sectoral, regional and national information services.

The preparations related to the forthcoming (1979) United Nations Conference on Science and Technology for Development. It appears inevitable that the Conference will devote attention to the international transfer of technological information since a number of managers of national scientific and technological information systems have been invited to contribute to the position papers being prepared by their countries.

The rapid transnational spread of information and communication technologies. In particular, the growth of computer telecommunications networks, such as

(1) Information Policy for Development: National and International Responsibilities. Main issues discussed at the first UNISIST Meeting on the Planning and Implementing of National Information Activities in Science and Technology. Herceg Novi, Yugoslavia, 20-23 April 1976. Paris, Unesco, 1976. (SC/76/CONF.690/COL.8)

EURONET and TYMSHARE, the accompanying capability of searching remote data bases, and the increase in the availability of data bases through both commercial and public channels may be instanced.

Increase in the level of experience in both bilateral and multilateral co-operation at regional and international levels, through such agencies as the Commission of European Communities, the Food and Agricultural Organization, and the International Centre for Scientific and Technical Information (Moscow).

Purpose of the Friedrichsdorf meeting

It was in the perspective of this changing environment, and of the growing resource of experience amassed by managers of scientific and technological information programmes that the Friedrichsdorf meeting was organized. Viewed by the organizers as the second in a series of forums held to facilitate the interchange of experience, especially as this might lead to the solution of problems under common attack, the forum had as its announced theme: The Management of Information Resources at the National Level.

A programme had been structured which featured seven sessions involving presentations and discussions on the following topics: the development of information resources; information materials and institutional infrastructures; opportunities and problems in utilizing information technology; planning and national policy formulation; social, economic, political, and administrative parameters of information planning; interrelationships among the policy and planning functions, and operations; and, finally, long-range implications of technological change for information systems.

These topics had been selected with the intention of dividing the theme into two principal aspects: issues involved in the development and administration of information resources in science and technology, and the relationship of these issues to overall planning and policy activities. A further dimension had been added to the programme through scheduling discussion of the rapidity of change in information and communication technologies.

The meeting was attended by 28 participants, 10 of whom had also been in attendance at Herceg Novi. All participants had been invited in their personal capacities from Unesco Member States with a view toward representation of countries at differing levels of development and in differing geographic areas.

Each discussion session was chaired by a different participant. Discussion of the presentations was both general and vigorous, with participants from countries with a longer experience in the management of information systems making many helpful suggestions. In addition, a generous amount of time had been allocated to permit the participants to exchange their views on a more intimate basis.

As was the case in the first meeting at Herceg Novi, the sessions were conducted informally. No official records or proceedings will be issued; instead, the summaries which follow are intended to identify the principal issues which were highlighted both in the presentations and in the ensuing discussions. These summaries are not presented in agenda order, but rather according to the amount of attention accorded them by the participants.

Four principal issues recurred throughout the discussions. They were: problems relating to document availability at the international level; the necessity of expanding the scope of the scientific and technological information universe; the problem of accommodation to rapid change in communications technology; and the need to achieve interdependence among national information systems.

The following text summarizes the views of the participants as they discussed specific problems in these broad areas.

2. Availability of information resources at the national level

The participants agreed that with the concentration of attention paid to the development of abstracting and indexing services, announcement bulletins and machine-readable data bases over the past few years, the problem of providing access to the bibliographic records of technical knowledge, while still an important concern, is now becoming secondary to that of ensuring the availability of the documents themselves. The most sophisticated of computer retrieval systems has little meaning if the documents, whose citations it retrieves, cannot be placed in the hands of users.

The problem of document availability is complex, and has many aspects. It is, however, in one or more of its forms, common to all countries, despite differing stages of development. Some of the aspects discussed are noted below:

The ensurance of document availability requires a closer interdependence among libraries and information centres. National planning for information services in science and technology must integrate the functions and services of the two in order to realize the optimum use of scarce information resources. Fortunately, the experience of several countries has shown that a good starting point for such integration is among libraries and information centres serving science and technology.

An increase in interlibrary lending at the regional and international levels appears to be desirable, although the potential of legal restrictions on the supply of photocopies in lieu of loans and the uncertainties of national postal services may operate to impose limits on its growth.

At the national level, every country must decide on the degree of self-sufficiency it wishes to attain, and on the extent to which it is desirable to rely on information resources supplied by other countries. In making this policy-decision, managers of national scientific and technological information systems should investigate carefully the three following questions:

What are the relative short and long-term costs involved in the options?

What is the relative reliability of the different information services?

What is the relative speed of the optional services?

Ongoing studies intended to develop answers to these questions were reported by two of the Friedrichsdorf participants.

The International Federation of Library Associations (IFLA) has initiated a long-range programme entitled: Universal Availability of Publications (UAP). The programme stresses the responsibilities of national library groups for the acquisition of the entire publication output of their own countries, and the undertaking of commitments to make the national product available, in its original or photocopy form, to other countries.

While operational, fiscal and legal difficulties were foreseen in implementing such a programme, its proponents are advancing it as a long-range goal for interlibrary co-operation in making documents available on a world-wide basis.

The use of microforms as substitutes for printed documents was advocated by several of the participants, who asserted their advantages for many specialized applications (e.g. the initial distribution of technical reports and the building of archival files). Other participants cautioned against a more general use of microforms on the grounds of lack of acceptance by the user communities.

Closely associated with the wider use of microforms, and attracting more concern from the Friedrichsdorf participants was the question of the extent to which revisions in national copyright laws might impede the international traffic in photocopies.

Photocopy has become the instrument of choice for much of the world's international information transfer and exchange on which the success of the UNISIST programme depends. In particular, the developing countries who rely on the photocopy services of the industrialized nations for a significant percentage of their information supply, are greatly concerned lest the latter, in revising their national copyright laws, will restrict the making of photocopies from the published literature, or add appreciably to the costs they now pay.

Participants from both the developing and the industrialized countries agreed that the possibility of such restriction in the interchange of scientific and technological information constitutes an urgent problem. Several international agencies, including Unesco's own International Copyright Information Centre, are conducting studies of the questions involved. One possible long-range solution being proposed by Unesco's UNISIST programme is that of achieving agreements on an internationally accepted code of conduct for the making and supply of photocopies.

Several of the participants from developing countries raised questions about access to proprietary information held by extra- and multinational corporations within their borders. It was pointed out by others that privately held information is frequently available under licensing arrangements, and that planners of national scientific and technological information systems must accommodate their services to the real world of private intellectual property rights.

It was generally agreed that newly independent countries have special problems relating to the development of information resources. Lacking an adequate library infrastructure, they are required to import many of the documents they require from day to day, and funds are seldom sufficient. What resources they have are dispersed and poorly organized. In some cases, important reports accomplished during an early period of dependency, exist only within the archives of the former patron State.

One possible remedy suggested is that of the co-operative development of regional resource libraries under the sponsorship of an intergovernmental organization. The long-range goal remains, however, that of the strengthening of the developing country's information infrastructure to enable it to participate to the fullest degree possible in co-operative activities at the international level.

3. Expanding the scope of the scientific and technological information universe

It will be recalled that the universe of knowledge initially conceived for the UNISIST programme was that of bibliographic information in the natural sciences, as generated and used by the member unions of Unesco's planning partner, the International Council of Scientific Unions (ICSU). Before the UNISIST feasibility study was completed, however, this universe had been expanded to include engineering and technology, and in the early years of the programme it was extended to include the social sciences on the one hand, and numerical data in the natural sciences on the other.

As countries have increasingly concentrated attention on information as a replenishable resource for economic and social development, and as information and communications technologies have been applied to facilitate information flow in all fields of human knowledge, arbitrary limitation to information in its bibliographic form or to information in predetermined fields of human endeavour have lost meaning. The recognition by the United Nations Secretary-General that the UNISIST principles offer a focus for the variegated specialized information programmes of the United Nations family of agencies attests to the blurring of boundaries.

To plan scientific and technological information systems at the national level solely for the transfer of bibliographic information has become anachronistic. And to circumscribe the development mission of such national systems by confining them to specific sectors of their national economies is to deny their potential for contributing to growth. These themes underlay the discussion of the scope of the universe for which national scientific and technological information systems must now accept responsibility. Aspects of this discussion follow:

It was generally agreed that provisions for acquiring and disseminating the unpublished report literature should be accorded high priority by any national system. Ensuring the availability of this literature has its own set of problems. Several countries reported successes in maintaining procurement offices in countries with high productivity. In addition, several governmental and intergovernmental information services have made special efforts to increase the general availability of the technical report literature.

Closely associated with the report literature is the universe of non-conventional information required for industrial development: industrial catalogues, design specifications, standards, patents, laws and regulations, information on research and development in progress, financial and economic information: in short, the wide range of information and data supportive of industrial productivity and national economic growth. The participants agreed that planning for national scientific and technological information services must calculate the needs for such non-conventional information in priority areas of development, and make provision for their acquisition and dissemination.

Several participants stressed the need to include provisions for economic and social information (including numerical and other non-bibliographic data) in national plans. Such inclusion is particularly important where the national information systems attempt to serve those who make decisions on matters of public policy.

Participants from the developing countries advocated the inclusion of practical information on existing technology as opposed to recent advances in high technology. Such materials would enable the national information services to assist their countries in the selection and application of appropriate well-tested technologies.

Other proposed extensions of the conventional boundaries of scientific and technological information included such fields as scholarly information in the humanities and management information systems.

As noted in one of the presentations, managers of national information systems must make their choices and determine their priorities in conformity with the national policy framework for economic and social development. While the techniques of information management are common to all countries, the national environments in which the services are to be established are unique. The ability of information managers to apply the common techniques to the unique environment is the criterion by which their success or failure can be judged.

The extensions discussed can be categorized into three groups. The first is concerned with the extension of the UNISIST concept into more fields of knowledge than science and technology. One of the participants, for example, noted that his government had conducted a study which identified a need for 2,500 specialized data banks.

The second group represents an extension of the types of non-bibliographic information for which the national system must plan. Numerical data bases in the sciences and engineering have already been accepted as a part of this universe. Beyond all doubt, data bases in the social sciences, of which there are many, will follow.

The third group represents an expansion of the communities to be served. No longer can the publics to be served be limited to scientists and engineers; the information services must be planned for the use of political and industrial decision-makers as well. And, as noted earlier, information services in pre-industrial societies must be designed to meet the needs of those concerned with the importation of existing, appropriate technologies.

Such extensions of the scientific and technological information universe as have occurred or as may occur in future serve to increase the number of options and enlarge the resources available to information system managers for meeting the complex needs of the national economies they serve.

4. Accommodation to rapid technological change

As identified below, the issues presented and discussed demonstrate the ambivalence felt by many of the participants concerning the utilization of a group of technologies which are undergoing a very rapid evolution. The rapidity of technological change in computers, computer networks, on-line search, and even in reprographic equipments has created a discontinuity with the past. The kinds of socio-technical communication systems made possible by the new technology lack precedence in human experience, and the managers responsible for their development feel both blessed and baffled as they confront the many opportunities which the new technologies have to offer. Discussion of this issue concentrated on the following points:

The participants agreed that it was imperative to keep themselves informed concerning new developments in information and communication technology so that they could be in a position to determine what best adapted to their needs. Indeed, participants with considerable systems experience urged the

postponement of procurement of expensive equipment until a thorough consideration of its applicability to the satisfaction of user needs and practices had been accomplished. As one means of keeping informed about the performance characteristics of new equipment, participants were referred to the International Referral Centre for Information Handling Equipment, established with assistance from the UNISIST programme at the University of Zagreb, Yugoslavia.

As a further practical measure for monitoring technological change, one participant proposed that Unesco sponsor periodic surveys of selected developmental areas (e.g. mini-computers), or compile reports of the experience of developing countries in introducing computer technology to information work. Potentially, the UNISIST Working Group on the Technology of Systems Interconnection could play a useful role in advising UNISIST national focal points on technological developments.

The extent to which managers of scientific and technological information systems and librarians can influence the evolution of communications technology was also discussed. Instances were cited where managers of information systems had been constrained to design processes to accommodate arbitrary features of computer hardware, thereby raising the question of whether they were masters of the technology or slaves to it. It appeared that the specialized needs of bibliographic processing systems constituted a relatively small market in relation to other areas of the economy (banking, industrial and commercial control applications, etc.), and that individual managers could have but little influence. It was suggested that they might band together in supra-national groups, and thereby acquire more power to influence technological development for their special purposes.

A mismatch of interest between the managers of the information systems and the manufacturers of information processing and communication equipments was noted. The former pursue standardization and compatibility so that they may more readily exchange units of information; the latter eschew standardization so that they may more readily develop a market for their products. This dichotomy of interest presents many difficulties for the managers of information systems who wish to develop co-operative activities employing compatible devices.

Problems occasioned by the rapidity of development and obsolescence of communications technology, as illustrated by the brief life span of a computer generation were also discussed. Only the most wealthy countries can afford to experiment with succeeding models of equipment. Usually, the managers of information systems are faced with difficult decisions as to the point in the development of a device when it is prudent to acquire it for incorporation in an operational system. This decision is complicated by the uncertainties of the standards-setting process described earlier.

A further question was asked: to what extent is it possible to anticipate technological change in the planning of national scientific and technological information systems?

None of these questions has a definitive answer, but they and related questions underline the importance of monitoring technological change closely.

The onrush of technological development creates a number of special problems for the developing countries. While the developed countries view communications technology in its relation to a post-industrial "knowledge society",

many of the developing countries are in a pre-industrial state and have a labour-intensive economy. A common apprehension, voiced by several of the participants, is that the technology gap appears to be widening daily. In the past, information processing equipments have been large and expensive; the relatively small populations to be served and the information inputs to be processed have not warranted large expenditures, and have increased the dependency of developing countries on others. Now, however, new developments in mini-computers and inexpensive large storage devices promise cost reductions which will accelerate computer utilization in the developing countries.

A question raised by several of the participants was the extent to which developing countries should plan on retracing the evolutionary steps taken by the industrialized countries, and the extent to which they might bypass the intermediate steps and develop information services using advanced technology. The more experienced participants advised on the latter strategy, assuming the technology to be appropriate to the need, and the economics favourable.

Another question raised was that of the role developing countries might play in the planning and operation of international information systems, as opposed to being cast as customers for systems designed and operated by others. The example of AGRIS was cited, where the Food and Agriculture Organization (FAO) had assisted developing countries in providing inputs. This led to a brief but favourable consideration of the international retrieval systems designed on the "territorial formula", where each country contributes its national bibliographic production in return for access to the contributions of the other participating countries.

Several participants stressed the point that information handling and communications technologies embraced far more than computers, tele-processing and satellites. In many instances, more conventional and less expensive technology were more appropriate for the work in hand. A typewriter, for example, may be better suited to a particular task than a computer-driven photo-composing device. The use of technology appropriate to the specific purposes to be served should constitute a general principle for all countries to follow, industrialized as well as pre-industrial.

In one session devoted to a consideration of the long-range impact of advanced communications technology on social institutions, the participants were invited to consider a world in which the replication of canonical information, facilitated since Gutenberg by the printed word, has been replaced by non-standard, personalized variations of records in machine-readable form. While this exposition of the ultimate in communications technology was viewed by some as dissociated from the communications needs, habits and processes of the real world, one participant noted that such a non-system would still require human intermediaries to trace and gain access to the unique versions.

5. Interdependence of national information systems

One of the basic conclusions of the UNISIST feasibility study was that the very magnitude and complexity of the task of providing access to the world's scientific and technical literature required international co-operation; no one nation could hope to command the resources to undertake the task single-handedly. Accordingly, a first objective of the UNISIST programme has been to foster the development of a new level of voluntary international co-operation.

It is gratifying, ten years after the initiation of the UNISIST study, to see how this conclusion has been validated by the experience of those charged with the responsibility of managing national information programmes serving science, technology and economic growth.

The necessity of interdependence and co-operation among national systems was a dominant theme of the Friedrichsdorf sessions. Some of the aspects of this theme which emerged during the discussions are noted below:

Each country, it was stated, must accept the responsibility of organizing and disseminating the scientific and technological information which it produces. But it would be disastrous for any country to rely on indigenous information alone. No country can be self-sufficient; all must be prepared to share their information products at the international level. Differences in the mix of independence and interdependence are a resultant of the needs of the individual countries, and the resources they can bring to bear.

In the case of the industrialized countries, task sharing has become a requirement for the development of large international data bases. Such task sharing has been accomplished variously through the sponsorship of an intergovernmental agency (e.g. the International Atomic Energy Agency), through a regional political-economic organization (e.g. the Commission of European Communities), or through bilateral agreements (e.g. MEDLINE).

Smaller industrialized countries have achieved successes in building specialized data bases co-operatively through the sponsorship of regional intergovernmental organizations. This suggests that the less developed countries might look to the comparable regional organizations in their geographic areas to sponsor the co-operative building of specialized data bases in high priority fields, as well as the communications linkage permitting access to them.

The sharing of resources and tasks at the international level creates optimal conditions for the standardization of practices internationally. On-line retrieval systems, available internationally, advance common definitions, search practices, and the utilization of homogeneous data bases, and thus become common denominators for the fields they cover.

In response to one participant's statement that the use of data bases created by others increased a developing country's dependency on systems to which it could not contribute, it was pointed out that no country loses by such dependency. The gain in ability to access information common to the rest of the world outweighed other considerations.

Several of the participants cautioned that in their experience true co-operation at the operating level takes dedication and effort by all the parties. In at least one case, it has taken six years of effort to effect operational success. At the multilateral level, this process may be accelerated by having one of the countries act as a "lead agency", rather than to have all on an equal footing. This view was confirmed by another participant engaged in a comprehensive multilateral activity, where one institution from each of the co-operating countries had been assigned responsibility to act as "lead agency" for a broad segment of the co-operative programme.

ANNEX I

Notes by the Rapporteur

The Rapporteur of the second UNISIST Meeting on the Planning and Implementing of National Information Activities in Science and Technology is fortunately in the position of being an impartial observer, without a national system to represent or a thesis to advance. Furthermore, since he served as well as the Rapporteur for the first meeting in Herceg Novi, he is privileged to have something of an historical perspective on this dynamic and rapidly growing field. Emboldened by these two advantages, he asks the indulgence of the participants in the Friedrichsdorf sessions as he makes the following personal observations:

(1) While at the policy level, the discussions appeared more to concentrate on matters of managerial and operational policy than on questions relating to the establishment of national goals and related organizational issues which occupied the Herceg Novi meeting. They reflected not only the gains in operating experience at national and international levels which have been achieved since the first meeting, but also the practical nature of the decisions which the planners and managers of national scientific and technological information services are called on to make.

(2) This more pragmatic orientation helped materially to increase the understanding of each other's problems by the participants from the industrialized and the developing countries, and resulted in a healthy interchange of views.

(3) The orientation of the national programmes for scientific and technological information toward the achievement of national goals for socio-economic development has resulted in a de facto broadening of the base of the UNISIST programme. This was made explicit in the discussion on changes in the boundaries of the universe of information with which the national systems and Unesco must deal, and is also implicit in the role which Unesco has played in offering the UNISIST programme as a model for the network of specialized information services being developed by the Specialized Agencies of the United Nations. It is also implicit in the contribution Unesco and the UNISIST programme plan to make to the forthcoming United Nations Conference on Science and Technology for Development.

(4) The meeting was held just prior to the first sessions of the Advisory Committee and the Intergovernmental Council of Unesco's new General Information Programme (PGI). It was encouraging to note in the discussions relating to document availability and to copyright a merging of interest of librarians and scientific information specialists.

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